ABSTRACT

A data processing system blind source separation of an overcomplete set of signals generally includes means for storing input from sensors in a mixed signal matrix **X 200**, noise in a noise matrix **V 202**, an estimate of the individual signals from the mixture of signals from the signal sources in a source signal estimate matrix $\hat{\mathbf{S}}$ **204**, and an estimate of environmental effects in a mixing matrix $\hat{\mathbf{A}}$ **206**, the matrices related by $\mathbf{X} = \hat{\mathbf{A}}\hat{\mathbf{S}} + \mathbf{V}$; generating an initial estimate of $\hat{\mathbf{A}}$ **208**; determining the number of, and associated lines of correlation of, each source from $\hat{\mathbf{A}}$, and representing the sources in the source signal estimate matrix $\hat{\mathbf{S}}$ **210**; jointly optimizing $\hat{\mathbf{S}}$ and $\hat{\mathbf{A}}$ in an iterative manner to generate an optimized source signal estimate matrix $\hat{\mathbf{S}}$ **212** and a final estimated mixing matrix $\hat{\mathbf{A}}$; and restoring the separated source signals from the optimized source signal estimate matrix $\hat{\mathbf{S}}$ **214**.